

REMARKS

This Amendment is fully responsive to the non-final Office Action dated August 20, 2008, issued in connection with the above-identified application. Claims 1-13 and 15-18 were previously pending in the present application. With this Amendment, claims 12, 13 and 15-18 have been canceled without prejudice or disclaimer to the subject matter therein; and claims 1 and 11 have been amended. Accordingly, claims 1-11 are all the claims that remain pending in the present application. No new matter has been introduced by the amendments made to the claims. Favorable reconsideration is respectfully requested.

To facilitate the Examiner's reconsideration of the present application, the Applicants have provided amendments to the specification and abstract. The changes to the specification and abstract include minor and editorial clarifying changes. Replacement paragraphs and a replacement abstract are enclosed, which show the changes made to the original specification and abstract. No new matter has been introduced by the amendments made to the specification and the abstract.

In the Office Action, claims 1 and 11 have been rejected under 35 U.S.C. 112, second paragraph, as being indefinite. The Examiner objects to the phrase "setting up individual analysis conditions," as being unclear. More specifically, the Examiner alleges that it is unclear what condition is being used for the analyzing recited in the claims.

However, the Applicants maintain that the above phrase is stated with sufficient clarity such that the claims particularly point out and distinctly claim the subject matter which the Applicants regard as the present invention. The phrase "analysis conditions" is used consistently in the claims and in the specification. Additionally, as describe on page 15 at lines 15-20 of the specification "analysis conditions" include thickness of layer, arrangement of electrode, electric conductivity of electrode, dielectric consistent of insulating layer and the like.

The manual of patent examining procedure (MPEP) indicates that claims which define patentable subject matter with a reasonable degree of particularity should be found acceptable. And, some latitude in the manner of expression of terms should be permitted even though the claim language is not as precise as the Examiner might desire. Instead, the essential inquiry is whether a claim sets out particular subject matter with a reasonable degree of clarity and

particularity. Additionally, definiteness of claim language must be analyzed not, not in a vacuum, by in the light of the following:

A) content of the particular application disclosure;

B) the teachings of the prior art; and

C) the claim interpretation that would be given by one possessing the ordinary level of skill in the pertinent art at the time the invention was made (e.g., see MPEP §2173.02).

Therefore, based on the consistent use of the phrase “analysis conditions” and a clear description of “analysis conditions” in the Applicants’ disclosure, the Applicants assert that one of ordinary skill in the art would clearly understand the above phrase, as recited in claims 1 and 11. Accordingly, withdrawal of the above claim rejection under 35 U.S.C. 112, second paragraph, is respectfully requested.

In the Office Action, claims 1, 2 and 4-11 have been rejected under 35 U.S.C. 102(b) as being anticipated by Liu et al. (an article entitled “Full-Wave Segmentation Analysis of Arbitrarily Shaped Planar Circuit,” 1997, IEEE, pages 1-9, hereafter “Liu”); and claim 3 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Liu.

Accordingly, the Applicants have amended independent claims 1 and 11 to help further distinguish the present invention from the cited references. Specifically, claim 1 has been amended to recite the following features:

“[a] method for analyzing an electromagnetic field of a circuit board based on shapes of conductor patterns and signal analysis conditions including steps of:

setting up initial shapes of conductor patterns in each layer of a multilayer circuit board;

setting up initial ports for input or output of an external signal in each conductor pattern;

dividing two-dimensionally the multilayer circuit board into a plurality of areas such that a first layer of the multilayer circuit board is divided into a plurality of areas using dividing lines and further layers of the multilayer circuit board are divided correspondingly using the same dividing lines;

setting up additive ports on edges of the conductor pattern which has been created by area-division;

setting up individual analysis conditions for the initial ports and the additive ports,

respectively;

performing an electromagnetic analysis of the multilayer circuit board by the divided area, based on the analysis conditions; and

integrating results of the electromagnetic analysis over each of the divided areas, thereby obtaining results of the electromagnetic analysis over the whole circuit board.” (Emphasis added)

The features noted above in independent claim 1 are similarly recited in independent claim 11. Additionally, the features noted above are fully supported by the Applicants’ disclosure (see e.g., Figs. 2A-2E and pages 11-17).

The present invention, as recited in claims 1 and 11, is directed to a method and apparatus for analyzing an electromagnetic field of a circuit board after dividing the circuit board into a plurality of areas. Specifically, the results of the analysis are obtained by performing the electromagnetic analysis over each of the divided layers and then integrating the results. The Approach applied by the present invention can drastically shorten running time of the electromagnetic analysis, and costs associated with designing a circuit board. For example, the results of the analysis can be obtained quickly for providing feedback when designing a circuit board, thereby optimizing the design process.

In the Office Action, the Examiner relies on Liu for disclosing or suggesting all the features recited in independent claims 1 and 11. However, the Applicants assert that Liu fails to disclose or suggest all the features recited in independent claims 1 and 11, as amended.

Liu discloses a full-wave segmentation method for analyzing a microwave planar circuit which is divided into several small sections. As illustrated in Fig. 1a and 1b of Liu, a printed circuit board is divided into four smaller segment denoted by blocks A, B, C and D, respectively. Additionally, two external ports are connected to blocks A and B; and interconnections between the segments can be uniform transmission lines such as microstrips. As described in Liu, the electromagnetic fields of the individual segments (i.e., blocks A, B, C and D) can be determined by knowledge of the tangential electric (or magnetic) fields over the corresponding reference plans.

As clearly noted in Liu, Figs. 1a and b fail to disclose or suggest details of port settings during area-division. Liu also fails to disclose or suggest how to set up any ports for electrodes of all elements (including dielectrics required for area-division). Additionally, Liu, merely discloses a microwave planar circuit that is divided into several small sections. Conversely, the present invention (as recited in claims 1 and 11) is intended to add a single port of a single electrode residing in a divided area when dividing electrodes residing in the same plan, which is believed to be a significant difference between present invention and Liu.

Based on the above discussion, independent claims 1 and 11 (as amended) are clearly distinguished over Liu. Therefore, independent claims 1 and 11 are not anticipated or rendered obvious by Liu. Likewise, claims 2-10 are also not believed to be anticipated or rendered obvious by Liu at least by virtue of their dependency from independent claim 1.

In light of the above, the Applicants respectfully submit that all the pending claims are patentable over the prior art of record. The Applicants respectfully request that the Examiner withdraw the rejections presented in the Office Action dated August 20, 2008, and pass the present application to issue. The Examiner is invited to contact the undersigned attorney by telephone to resolve any remaining issues.

Respectfully submitted,

Kazuhide URIU et al.

/Mark D. Pratt/

By: 2008.11.06 14:48:25 -05'00'

Mark D. Pratt
Registration No. 45794
Attorney for Applicants

MDP/ats
Washington, D.C. 20006-1021
Telephone (202) 721-8200
Facsimile (202) 721-8250
November 6, 2008